

Author Index

Numbers in parentheses are reference numbers and indicate the author's work is referred to although his name is not mentioned in the text. Numbers in *italics* show the pages on which the complete references are listed.

A

Abe, A., 65(73,74), 69, 212(165), *264*
Abkin, A., 76(106,107), *106*
Addink, E. J., 37(13), *68*
Albeck, M., 74(49), *105*
Aldoshin, V. G., 88(255), *111*
Alfrey, T., Jr., 252(258), 254(258), *268*
Allcock, H. R., 78(131), *107*
Allegra, G., 62(56), 63(56), 65(65), *69*,
124(33,34), 126, 127, *259*
Allen, G., 74(46,47), 85(47), *105*
Allen, P. E. M., 142(62b), *260*
Allen, V. R., 74(66), 85(66), 93(280),
94(280), 96(313), 99(280), *105*,
111, 112
Altares, T., Jr., 74(66,342), 85(66), 93
(280), 94(280), 96(313), 99
(280), *105, 111-113*
Ambroz, J., 206(155), 208, *264*
Ambrozh, K., 250(252), *267*
Amerongen, G. J. van, 247(241), *267*
Anderson, A. W., 148(74), 221(74), *261*
Anderson, W. S., 169(126), 170(126),
171, 263
Angelescu, E. M., 243(222), 244, *266*
Angelo, R. J., 88(346), *113*
Appenrodt, J., 74(82), 93(82), *106*
Arest-Yakubovich, A. A., 74(43),
76(119), 79(154), 97(154), *105*,
107, 108
Arlman, E. J., 47, *68*, 125, 128(41),
163(99), 164, 169(117), 170(117),
178(43), 181, 184, 220, *269, 262*,
263, 265

Asami, R., 74(42), 82(336), *105, 113*

Aseev, Yu. G., 243(229), *266*
Ashby, C. E., 148(74), 221(74), *261*
Ashby, G. E., 169-171(109), 253(109),
262
Atlas, J. D., 66(68), *69*
Averill, S. J., 83(232), *110*
Avny, Y., 75(96), *106*
Azimov, Z. A., 82(341), *113*

B

Bacska, R., 206, 240, *264, 266*
Bahr, K., 76(109), 87(109), *106*
Baer, M., 88(259), 89(259), *111*
Bailey, G. C., 198(149), *263*
Baker, W. P., 82(217), *109, 244, 249*
(247), *267*
Balas, J., 118(9), 122, 140(58), 141(9),
171, 208, 247(9), *258, 260, 264*
Baldeschwieder, J. D., 55, *69*
Bandermann, F., 79(166), 97(166),
103(315), *108, 112*
Bandini, F., 220(174), 221(174), *238*
(174), *265*
Barbe, P., 130(46), *260*
Bartlett, P. D., 78(136), *107*
Bartley, W. J., 241(211), 242(211),
266
Barzakay, S., 74(69), 75(98), *105, 106*
Basova, R. V., 76(119), *107*
Bassi, I. W., 124(32), 126(32), 127(32),
140(57), 239(197,201), 242 (216a),
259, 260, 265, 266
Bawn, C. E. H., 72(6), *108*
Beaman, R. G., 79(186), *109*

Beattie, W. H., 85(237), *110*
 Beears, W. L., 219(169), *264*
 Beerman, C., 164, 173(100), 219, 220
 (100), *262*
 Beintema, J., 37(13), *68*
 Bell, V. L., 78(332), *113*, 249(239)
267
 Benedetti, E., 52(35), 60(35), *68*, 209
 (98a), *262*
 Beneš, M. J., 77(127,330), *107*, *113*
 Benning, C. J., 169(109,110,114), 170
 (109,110,114), 171(109,110), *253*
 (109), *262*
 Benoit, H., 89(264), *111*
 Berger, G., 89(269), *111*
 Berger, M., 2(3), 7(3), 17(3), 18(21),
 19(3,21), 24(3), 25(3), 27(3), *30*, *31*
 Berger, M. N., 126(45), 130, 133(45),
 141, 227, 229(45), 230, 233(45),
 234, 235, *260*
 Bergmann, E., 76(108,115), *108*
 Berlin, A.A., 243(229), *266*
 Bernardini, F., 83(228), *110*, 173(135),
 250(254), *263*, *267*
 Bestian, H., 161(92), 164, 173(100),
 219, 220, *261*, *262*, *264*
 Betz, W., 74(72), *105*
 Bhattacharyya, D. N., 74(24,25,45),
 97(24,25,45,316), 102(25,45,316),
104, *105*, *112*
 Bickel, A. F., 153(81), 172(81), *261*
 Bier, G., 118(14), 144, 145, 226(185),
 230, 233(185), 235(191,192), 236,
 238(191,192), 255, 256, *258*, *261*,
265
 Binder, J. R., 78(141), *107*
 Birshtein, T. M., 62(57), 65(57,63), *69*
 Blais, F., 137, 138, *260*
 Blomquist, A. T., 82(215), *109*
 Bobkov, B. N., 166, 219(102a), *262*
 Boettcher, W., 82(335), *113*
 Bogomol'nyi, V. Ia., 250, *267*
 Bogomolova, N. F., 240(206), *266*
 Bohrer, J. J., 252(258), 254(258), *268*
 Bondi, A., 65(62), *69*
 Boor, J., Jr., 33, 37(14,15), 38–40(14),
 41, 42(14), 43(14), 44, 45(14), 46
 (14), 47(15), 55(14), 58(14,42), *61*
 (14), 63(14,42), 64(14,42), 65(14),
68, *69*, 115, 125(38,40), 128(40), 136
 (50,59), 138(50), 140(59), 141(54),
56, 146, 147(40), 158, 159(38), *160*
 (40), 162, 163(54), 169(115), 170
 (115), 171(40,95), 172(40), 174(115),
136, 175(136), 178(40), 179(59),
 185(59), 187, 191, 192(40), 193, 195
 (59), 198(54), 200–203(40), 204
 (54), 205(54), 208(40,54,95), 223
 (95), 225(38,115), 230, 237(54), 241
 (216), 242(216), 253(59), 259, *260*,
262, *263*, *266*
 Booth, C., 85(237), *110*
 Borchert, A. E., 239(202), *265*
 Borisova, N. P., 62(57), 65(57), *69*
 Bostick, E. E., 74(54,56), 79(54, 56,
 156,157), 85(156), 89(268) 90(268),
 97(56,157), 103(56,157), *105*, *108*,
111
 Boutin, H., 2(3), 7(3), 17, 18(21), 19
 (3,21), 21, 22, 24(3), 25(3), 27(3),
30, *31*
 Bovey, F. A., 35, 48, *68*
 Bower, F. M., 74(19), 85(19), *104*
 Bradely, L. J., 74(17), 85(17), *104*
 Bradley, C. W., 93(287), *112*
 Braendlin, H. P., 153(81), 172(81),
261
 Brandrup, J., 34(4), *67*
 Braun, D., 74(71), 92(272), 99(297),
105, *111*, *112*
 Braun, J. v., 213
 Breil, H., 33(1), *67*, 117(1), 119(1),
215(1), *258*
 Bresler, S. E., *86*, *111*
 Breslow, D. S., 121(22,23), 122(22,23),
 123(23), 139, 165, 169–171(106),
 198(106), 218, 219(101), 239(22,23),
259, *262*
 Breuer, F. W., 124(39), *259*
 Brockhouse, B. N., 3(6), *30*
 Brody, H., 98(291), *112*
 Brown, D. W., 48, 55, *68*
 Brown, H. P., 96(312), *112*
 Brown, T. L., 103(326), *113*

Brown, W. B., 86(242), 110
Bruce, J. M., 83(222), 110
Brugger, R. M., 10(11), 31
Brujin, P. H. de, 142, 143, 216, 261
Buck, O. G., 99(298), 112
Bueche, F., 94(277), 95(277), 111
Bur, A. J., 76(125), 107
Bushick, R. D., 166, 219(102b), 262
Butler, G. B., 244(234), 245(234), 267
Butler, K., 75(94), 106
Bykhovskii, V. K., 173(136a), 204
(136a), 207, 263, 264
Bystrov, V. F., 167, 262
Bywater, S., 72(11), 74(20,35,52,53,
55,57,79,81), 75(84-86), 79(172,
177), 80(196,197,200,201), 81
(202), 83(11), 85(20,84), 93(81,288),
97(35,52,172,177), 102(35), 103(52,
172), 104-106, 108, 109, 112

C

Calderon, N., 85(236), 110
Cambini, M., 58, 59, 62(43), 69, 82
(214), 109
Cameli, N., 243(219), 266
Campbell, T. W., 239(198), 265
Cannon, C. G., 21(27), 22, 31
Cantow, H. J., 85(233,235), 110
Cantow, M. J. R., 51(33), 68
Canty, G., 75(93), 108
Caporiccio, G., 249(248,249), 267
Caporicero, G., 239(201), 265
Carbonaro, A., 141(60,61), 260
Carella, G., 242(216a), 266
Carlson, E. J., 248(243), 267
Carraro, M. J., 21(28), 22, 31
Carrick, W. L., 122, 139(29,52,53),
140(29), 148, 149, 157, 167, 168,
169-171(123), 220(53), 221, 222,
239(29), 252(52), 254(53), 255(53),
259-261, 263, 265
Case, L. C., 66(68), 69
Cash, G. O., Jr., 205(154), 206(154),
264
Castelli, R., 225(184), 265
Caunt, A. D., 206, 229, 230, 264
Cavender, J. V., 230(193), 265
Centola, P., 38(18), 39(18), 42(18), 68,
220(173), 264
Centoni, L., 213
Cesca, S., 249 (246), 251(256), 267, 268
Champtier, G., 89(260,262), 91(262),
111, 243(225), 266
Chasar, A. G., 221(180), 265
Cherkashin, M. I., 243(229), 266
Chernovakaya, R. P., 207, 264
Chesnokova, N. N., 79(147,175), 97
(147), 107, 108
Chien, J. C. W., 230, 234, 235, 236
(190), 265
Chirkov, N. M., 264
Chujo, R., 51(31), 68
Chukovskaya, E. Ts., 169(119), 170
(119), 262
Ciampelli, F., 58(44), 69, 118(18), 243
(219,236), 246(236), 269, 266, 267
Ciardelli, F., 162(96,97), 209(96,98a),
210-212(97), 213, 214, 217(96),
218(96), 262
Claes, P., 89(263), 111
Clark, E. S., 27(33), 31
Clark, J. E., 74(65), 103(65), 105
Clark, K. J., 212(165), 251, 264, 267
Clarke, R. G., 79(156), 85(156), 108
Clauss, K., 220, 264
Cleary, J. W., 96(300), 99(300), 101
(300), 112
Cohn, E. S., 81(203), 89(203), 109
Coleman, B. D., 86, 110, 111
Condit, P. C., 156(85), 225(85), 261
Contois, L. E., 239(199), 265
Coobes, J. D., 74(18), 85(18), 104
Cooper, W., 207, 228, 264
Coover, H. W., Jr., 160, 169(116,127,
129,130,132), 170(116,127,129,
130,132), 171(116), 172(127,129,
130,132), 178, 179(90), 205, 206,
208(153), 230, 233(90), 235(90),
261-264
Corradini, P., 34(3), 35(7), 37(11),
56(11), 60, 61(72), 63(11), 64(11),
65(64,65), 67-69, 117(3), 119(3),
124(32-34), 126, 127, 135, 136(51),
137(51), 140(57), 194(147), 239(197),

243(223), 244(223), 247(240), 248 (240), 258-260, 263, 265-276

Cossee, P., 47, 68, 125, 149-152, 178 (43,75), 181, 215, 259, 261

Cottam, B. J., 80(197), 109

Cowie, J. M. G., 74(20), 85(20), 104

Cram, D. J., 46, 68

Crespi, G., 118(15,16), 252(15,16), 258, 259

Cubbon, R. C. P., 74(59,62,63), 79 (184), 83(227), 97(62,63), 103(63), 105, 109, 110

Cundall, R. B., 75(103), 106

D

Dainton, F. S., 74(28), 104

D'Alelio, G. F., 76(345), 113, 169 (107), 170(107), 262

Dall'Asta, G., 83(228), 110, 118(17-20), 241(17,212-215), 242, 251(256), 253(212-215), 259, 266, 268

Danner, H. R., 2(3), 7(3), 17-19, 21 (18), 22, 24(3), 25(3), 27(3), 30, 31

Danusso, F., 64(59), 69, 117(3), 119 (3), 125(37), 138(51b), 215(168), 239(200), 258-260, 264, 265, 267

Davidson, H. R., 251(256), 268

Davis, W. R., 78(331), 113

Davydova, S. L., 82(344), 113

Decker-Freyss, D., 89(265), 94(282), 111

De La Mare, H., 140(58), 171, 260

De Luca, D., 220(174), 221(174), 238 (174), 265

Demin, O. I., 219(170), 264

Dersch, F., 76(110,112), 106

Deshpande, A. B., 260

Desreux, V., 34(6), 68

Desytyova, N. V., 76(119), 107

Diachkovsky, F. S., 142(62a), 260

DiCarlo, E. N., 167, 262

Diem, H. E., 79(145), 107

Dietrich, H., 103(324), 113

Dimbat, M., 241(216), 242(216), 266

Dimonie, M., 250(252), 267

DiPietro, J., 82(214), 109, 205(152), 206(152), 264

Doak, K. W., 238(195), 265

Dolgoplosk, B. A., 79(150,171,182), 107, 108, 207(160), 208, 264

Dologopolskaya, P. I., 206(156), 264

Donati, M., 75(105), 106

D'Onofrio, A. A., 240(208), 266

Donovan, J. L., 17(17), 31

Doran, M. A., 74(67), 105

Dostal, H., 84, 110

Driver, J., 75(103), 106

Duck, E. W., 153, 154, 156, 169 (124a), 170(124a), 172(124a), 261, 263

Dulmage, W. J., 74(74), 105

Dulog, L., 66, 69

Dunham, K. R., 239(199), 265

Dunkelberger, D. L., 81(203), 89(203), 109

Durgarian, S. G., 250(254b), 267

Dyachkovskii, F. S., 166, 167, 219 (103), 262

E

East, G. C., 74(58), 105

Eaves, D. E., 207(159), 264

Eberhardt, G. G., 78(331), 113

Edgecombe, F. M. C., 173(136c), 263

Edwards, T. E., 83(227), 110

Egle, G., 92(270,271), 111

Eirich, F., 143, 261

Eisenberg, A., 83(218,219), 86, 110, 111

Eley, D. D., 75(103), 106

Elliott, J. J., 240(205), 266

Ells, F. R., 88(257), 111

Enikolopyan, N. S., 48(24), 68

Erussalimsky, B., 76(327), 113

Evans, M. G., 74(75), 105

Evans, R. A., 80(194), 109

F

Faber, J. W. H., 239(199), 265

Fantalova, E. L., 239(203,204), 265

Farbenfabriken Bayer, 169(127), 170 (127), 172 (127), 263

Farbwerke Hoechst, 237, 256

Farina, M., 59(46), 69, 75(105), 106, 177(137,138), 263

Farren, D. W., 83(222), 110
 Farrow, G., 64(60), 89
 Feay, D. C., 172, 263
 Fedoseeva, G. T., 169(128a), 170
 (128a), 172(128a), 207(162a), 263, 264
 Feit, B. A., 75(100), 106
 Feldman, C. F., 156(83), 227(83), 230,
 233(83), 236(83), 261
 Fellers, J. F., 103(321), 113
 Fellmann, R. P., 81(208), 109
 Ferguson, R. C., 53(39), 89
 Ferraris, M., 225(184), 265
 Fetter, L. J., 71, 73(15), 74(56), 75
 (89), 76(125), 77(329), 78(130,137),
 79(56,153,157,158,183), 85(89), 88
 (15), 90(15), 91(15), 93(289), 97
 (56,157,158,183), 99(295), 101(311),
 103(56,157,158,183), 104-108, 112
 Fettes, R. C., 81(206), 109
 Field, N. D., 244(233), 267
 Figini, R. V., 74(33,38), 86, 97(33,38,
 319), 102(33,38,319,320), 104, 110,
 118
 Figueruelo, J. E., 81(204), 85(204), 109
 Finaz, G., 87(276), 89(267), 95(276),
 98(276), 99(276), 101(267), 111
 Fiore, L., 122(26), 248(245), 259, 267
 Fischer, M., 169(128), 170(128), 172
 (128), 263
 Fischer, W., 99(297), 112
 Fletcher, K., 141, 260
 Flory, P. J., 55, 65(73,74), 69, 72(14),
 84, 104, 161(94), 224(94), 261
 Flory, P. J., 72(14), 84, 104
 Folt, V. L., 248(243), 267
 Fontanille, M., 89(260,262), 91(262),
 111
 Foster, F. C., 78(141), 107
 Fowkes, F., 141(56), 260
 Fox, T. G., 86, 111
 Francois, B., 79(151,159), 97(159),
 103(159), 107, 108
 Frankel, M., 74(49), 105
 Franta, E., 88-91(256), 98(256), 111
 Frederick, M. R., 219(169), 264
 Freidlina, R. Kh., 169(119), 170(119),
 262
 Frenkel, S. Ya., 88(255), 111
 Frey, D. A., 249(239), 267
 Freyss, D., 89(264), 111
 Friedlander, H. N., 146, 147(72), 153,
 156, 197(150), 261, 263
 Friedman, S., 78(136), 107
 Fries, B. A., 156(85), 225(85), 261
 Fujita, Y., 83(220), 110
 Fukin, V. K., 219(170), 264
 Fukui, K., 230, 233(188), 265
 Fukumoto, S., 230(188), 233(188), 265
 Fukushima, K., 18(19), 20(19), 31
 Furukawa, J., 75(99), 83(220), 106,
 110, 146, 243(218,218a), 249(238),
 261, 266, 267
 Furusaki, S., 78(138), 107

G

Gabant, J. A., 125, 126(44,44a-e),
 129, 164, 260
 Gadkary, S. D., 94(277), 95(277), 111
 Gall, E. J., 244(232), 267
 Gallazzi, M. C., 169(125), 170(125),
 171, 263
 Gallot, Y., 87(276), 95(276), 98(276)
 99(276), 111
 Galluccio, R. A., 80(194), 109
 Ganis, P., 60, 61(72), 65(64,65), 89
 Gantmakher, A. R., 74(43,60,61), 76
 (60,119), 79(60,148,149,154,160,
 174), 97(60,61,154), 103(60,61),
 105, 107, 108
 Garrett, B. S., 81(210), 109
 Garrison, W. E., Jr., 118(11a), 258
 Gatti, G., 125(36), 158(36), 205(152),
 206(152), 259, 264
 Gaylord, N. G., 120(21), 160(21),
 238(21), 259
 Geacintov, C., 74(23,29), 97(23), 102
 (23), 104
 Gee, G., 74(46), 105
 Geipel, L. E., 124(39), 259
 Gellert, H. G., 78(135), 107
 Gerber, A., 76(121), 107
 Gervasi, J. A., 94(279), 95(290), 111,
 112
 Ghassan-Zade, V., 76(327), 113

Ghiglia, W., 69

Giachetti, E., 224(182), 265

Giannini, U., 121(25), 122(25), 139
(25), 157(25,87), 220(174), 221(174),
238(174), 239(25), 249(246), 251
(256), 259, 261, 265, 267, 268

Gianotti, G., 64(59), 69, 138(51b), 260

Gibbs, C. F., 79(145), 107, 248(243),
267

Gilbert, H., 83(232), 110

Gilchrist, A., 154, 155, 261

Gilmans, H., 93(284,287), 96, 112

Giongo, G. M., 179(44f), 260

Gippin, M., 118(8,8a), 122(8,8a), 141
(8,8a), 208, 247(8,8a), 258

Glusker, D. L., 80(192-194), 85(193),
109

Gold, L., 86, 110

Goldberg, E. J., 100(304), 101(304), 112

Gol'dfarb, Yu.Ya., 240(206), 251
(257a), 266, 268

Gole, J., 92(273), 111

Goode, W. E., 80(198), 81(206,208,
210), 109

Goodman, M., 34(4), 67, 212, 215,
216, 264

Goodrich, B. F., Co., 100(307), 112

Goodrich-Gulf Chemicals Co., 118
(10), 122(10), 247(10), 248(10,243),
258, 267

Gornick, F., 86, 110

Gosnell, A. B., 94(279), 95(290), 111,
112

Goutiere, G., 92(273), 111

Grace, W. R., and Co., 169(113), 170
(113), 262

Graevskii, A. I., 219(170), 264

Graf, R., 161, 261

Graham, R. K., 81(203), 89(203,261),
90(261), 91(261), 109, 111

Grant, I. J., 59, 69

Gratch, S., 81(210), 109

Greber, G., 92(270,271), 111

Gresham, W. F., 169(120), 170(120), 262

Griegesom, B. M., 126(45), 130, 133
(45), 227, 229(45), 230, 233(45,
189), 234-236, 238(189), 260, 265

Gross, S. T., 251(257), 268

Grosser, F., 251(257), 268

Guiffre, L., 224(183), 243(224), 244
(224), 265, 266

Gumboldt, A., 144, 145, 229, 233
(187), 261, 265

H

Hall, J. L., 85(234), 110

Ham, G. E., 238(196), 265

Hamrik, O., 206(155), 208(163), 264

Hanford, W. E., 78(132), 107

Hargitay, B., 125, 269

Harries, C., 78(139), 107

Hart, R., 83(224), 110

Hartley, D. B., 80(190), 109

Hartman, M., 83(225), 110

Hasegawa, M., 249(237), 267

Hathaway, C. E., 26, 27(32), 31

Haubein, A. H., 93(284), 112

Hauser, C. R., 74(78), 106

Haven, A. C., Jr., 239(198), 265

Havinga, R., 220(175), 265

Helden, R. van, 153, 154, 156, 172
(81), 261

Heller, J., 75(340), 113, 250, 267

Helminiak, T. E., 94(277), 95(277),
111

Hercules Powder Co., 252(263), 268

Hermans, J. J., 86, 111

Herner, M., 74(71), 105

Hewett, W. A., 250(251), 267

Hidemitsu, T., 27(34), 31

Higashihara, K., 243(230), 267

Higginson, W. C. E., 74(75-77), 105,
108

Hock, C. W., 131, 135(45a), 136, 260

Hoeg, D. F., 93(285), 112, 136(48),
169(124,133), 170(124,133), 171
(124), 172(133), 183, 260, 263

Hoffend, T. R., 76(345), 113

Hoffman, A. S., 156(85), 225

Hoffman, W., 79(165), 108, 230(191),
235(191), 236(191), 238(191), 265

Hogan, J. P., 197(151), 264

Holzkamp, E., 33(1), 67, 117(1), 119
(1), 215(1), 258

Hopkins, E. A. H., 249(250,250a), 267
 Horne, S. E., Jr., 248(243), 267
 Hostalka, H., 74(32,33,36), 97(32,33,
 36,318), 102(32,33,36,318), 104, 112
 Hsieh, H., 74(64), 76(120), 79(178,
 179), 85(64), 97(64), 99(298), 100
 (303), 101(303,310), 103(64), 105,
 107, 112
 Huch, A., 148(73), 152(73), 261
 Huch, C., 148(73), 152(73), 261
 Huggins, M. L., 34(6), 68, 146, 261
 Hughes, D. J., 4(8), 31
 Huglin, M. B., 92(275), 111
 Hurst, H. G., 227(186), 261

I

Ichikawa, I., 79(339), 113
 Ideguchi, Y., 18(19), 20(19), 31, 59,
 69, 177(139), 263
 Ikeda, R. M., 88(346), 113
 Imoto, M., 241(209,209a), 243(217), 266
 Itoh, Y., 21(29), 22, 31
 Iwakura, Y., 79(339), 113
 Iwamoto, A., 241(210), 266
 Iwayanagi, S., 27(34), 31
 Iyengar, P. K., 10(12), 31

J

Jacob, L., 76(113,114,118), 106, 107
 Jain, R. K., 86, 110
 Jarivitzky, P. A., 142(62a), 260
 Jenner, G., 79(343), 113
 Johnson, A. F., 76(122), 79(177), 93
 (288), 97(122,177), 103(122), 107,
 108, 112
 Johnson, D. R., 243(220), 266
 Johnson, J. F., 51(33), 68
 Johnson, J. R., 82(215), 109
 Joyner, F. B., 169(130,132), 170(130,
 132), 172(130,132), 205(153,154),
 206(153,154), 208(153), 263, 264

K

Kagiya, T., 230(188), 233(188), 265
 Kaiser, V. E., 82(334), 113
 Kambara, S., 141(55), 190(145), 243
 (228), 247(55), 260, 263, 266

Kamp, F. P. van de, 206, 264
 Kampf, M. J., 89-91(261), 111
 Kanai, H., 80(199), 109
 Kapur, S. L., 260
 Karapinka, G. L., 157, 168(88), 169-
 171(123), 221(123), 261, 263
 Kargin, V. A., 82(344), 113
 Karol, F. J., 139(52), 168, 252(52),
 260
 Katchman, A., 239(202), 265
 Kato, Y., 51(32), 68
 Kawabata, N., 79(188), 81(188), 109
 Kawasaki, A., 83(220), 110
 Kawazura, H., 88(258), 90(258), 91
 (258), 111
 Keaveney, W. P., 243(221), 266
 Kelley, D. J., 79(178), 82(216), 108,
 109
 Kennedy, J. P., 72(10), 104, 239, 266
 Kern, R. J., 74(73), 105, 227(186), 265
 Kern, W., 66, 69, 74(71,72), 105
 Khanna, S. N., 74(42), 105
 Kiepert, K., 224, 265
 Kincaid, J. F., 81(210), 109
 King, C., 75(104), 106
 King, J. S., 8(10), 17, 31
 Kingsley, C. B., 75(340), 113
 Kirchner, K., 74(70), 105
 Kirshenbaum, K., 65(61), 69
 Kissin, Yu. V., 48(24), 68, 245(234a)
 267
 Kohn, E., 230, 265
 Konishi, A., 83(231), 110
 Kooyman, E. C., 153, 154, 172(81),
 261
 Kopacheva, E. N., 79(150), 107
 Kopecky, K. R., 46, 68
 Koral, J. H., 77(126), 107
 Korn, A. C., 89 (260), 111
 Korotkov, A. A., 74(39), 79(147,175,
 176), 80(195), 82(341), 86(249), 88
 (255), 97(147), 102, 104, 107-109,
 111, 113, 126(45b), 131, 161(93),
 207, 260, 261, 264
 Kostina, S. I., 207(160), 264
 Kothari, L. S., 1-3(2), 6(2), 30
 Kovalev, N. V., 249(247a), 267

Krasnoselskaya, I., 76(327), 113
 Krasulina, V. N., 80(195), 109
 Kray, R., 83(221), 110
 Kreider, L. C., 219(169), 264
 Krentsel, B. A., 152, 240(206), 241
 (210a), 251(257a), 261, 266, 268
 Krigbaum, W. R., 64(58), 69
 Krimm, S., 26, 31
 Kroper, H., 169(121), 170(121), 262
 Kropachev, V. A., 79(171,182), 108,
 208(164a), 264
 Kugel, R. L., 78(131), 107
 Kummer, J. T., 169(131), 170(131),
 172(131), 263
 Kuntz, I., 76(121), 79(181), 97(181),
 103(181), 107, 108
 Kuwata, K., 74(68), 105
 Kuznetsova, E. M., 79(150), 107
 Kyner, W. T., 86, 110

L

Lachi, A. M., 136(49), 185(49), 226
 (49), 260
 Lachi, M. P., 245(235), 267
 Lambert, J. M., 251(257), 268
 Lands, I. G., 243(226), 266
 Langer, A., 78(133,134), 107
 Langer, A. W., Jr., 72(10), 104
 Lanzi, G., 38(18), 39(18), 42(18), 68,
 163(98), 220(98,173), 262, 264
 Lanzo, R., 121(24), 122(24), 139(24),
 157(24), 239(24), 269
 Laporte, S. J., 240, 266
 Lardieci, L., 213
 Ledwith, A., 72(6), 103
 Lee, C. L., 74(24,25), 75(90), 83(230),
 97(24,25), 102(25), 104, 106, 110
 Lehmann, G., 118(14), 229, 230(191,
 192), 233(187), 235(191,192), 236
 (191,192), 238(191,192), 255(14),
 258, 265
 Leng, M., 89(265), 111
 Lenz, R. W., 78(138), 107
 Leuhering, H. J., 230(192), 235(192),
 236(192), 238(192), 265
 Levesque, C. L., 81(210), 109
 Levy, M., 71(1), 74(1,42,80,81), 88
 (254), 89(269), 93(81), 103, 105,
 106, 111
 Liang, C. Y., 26, 31
 Liebman, S., 136(48), 183, 260
 Lipkin, D., 74(37), 104
 Lishanskii, I. S., 161(93), 207(162b),
 261, 264
 Litt, M., 86, 110
 Liu, K. J., 80(333), 113
 Livigni, R., 74(54), 79(54,157), 97
 (157), 103(157), 105, 108
 Llano, E., 81(204), 85(204), 109
 Loebel, A. B., 124(39), 259
 Löflund, I., 92(272), 111
 Lohr, G., 74(34,38), 97(38), 102(38,
 320), 104, 112
 Lombardi, E., 51-54(34), 68, 243
 (224), 244(224), 266
 Long, W. P., 165, 219(101), 262
 Longi, P., 83(228), 110, 136(49), 173
 (135), 185(49), 226(49), 250(254),
 260, 263, 267
 Longiave, C., 225(184), 266
 Looy, H. M. van, 125, 126(44a-e),
 151, 164, 173(44d), 179(44e), 182,
 183, 188(44e), 260
 Lorenzi, G. P., 162(96,97), 209(96),
 210-212(97), 213, 214, 217(96), 218
 (96), 262
 LoSacco, F. J., 21, 23(25), 31
 Loucheux, M. H., 98(292,293), 112
 Luciani, L., 130(46), 260
 Ludlum, D. B., 148, 149, 221, 261
 Lukach, C. A., 118(13), 190, 228(13),
 234(13), 252(13,263), 255(13), 268,
 269
 Lundborg, C., 74(70), 79(161,162,
 167), 97(167), 103(167), 105, 108
 Lusk, D. I., 93(285), 112
 Lyman, D. J., 250(251), 267
 Lynch, P. F., 74(58), 105
 Lyons, H. D., 122(28), 247(28), 269
 Lysoff, I., 80(193), 85(193), 109
 Lysay, T., 74(22), 85(22), 104

M

Mabuchi, K., 249(238), 267

McCall, M. A., 205(154), 206(154), 264

Macchi, A., 239(200), 265

McConnell, R. L., 205, 206(154), 264

McCormick, H. W., 74(19,21), 75(83), 85(19,21,83), 104, 106

McIntyre, D., 74(17), 85(17), 104

McMordie, W. C., Jr., 243(226), 266

McQuarrie, D. A., 86, 111

Magat, M., 84, 110

Makimoto, T., 80(199), 109

Makovetski, K. L., 243(227), 266

Malatesta, A., 220(176), 228, 265

Mal'tsev, V. V., 82(344), 113

Mamontova, O., 76(106), 106

Manassen, J., 77(328), 113

Manley, R. St. J., 137, 138, 260

Mantica, E., 117(1), 119(1), 157(87), 258, 261

Margerison, D., 74(58,59,62,63), 97(62,63), 103(63,322), 105, 113

Marinangeli, A., 51-54(34), 68, 163 (98), 220(98), 262

Marion, T., 76(117), 107

Mark, H., 34(4,6), 67, 68, 84, 110, 120(21), 143, 160(21), 238(21), 252 (258), 254(258), 259, 261, 268

Mark, J. E., 65(73,74), 69

Maquardt, D. W., 53(39), 69

Martin, H., 33(1), 87, 117(1), 119(1), 215(1), 258

Martynoff, M., 243(225), 266

Marvel, C. S., 118(11,11a), 244(11, 232), 249(237), 258, 267

Mason, C. D., 138(51c), 260

Mathews, F., 78(140), 107

Matlack, A. S., 169-171(106), 198 (106), 262

Matsubara, I., 21(29), 22, 31

Matsuda, H., 18(24), 31

Matsuaki, K., 79(187), 109

Matveev, G. N., 219(170), 264

Mayer, G., 98(293), 112

Mayer, N., 79(185), 109

Mazurek, V., 76(327), 113

Mazzanti, G., 58(44), 69, 83(228), 110, 117(3), 118(17-20), 119(3), 121(24, 25), 122(24,25), 136(49), 139(24,25), 144(64), 152(64), 157(24,25,87), 169-172(122), 173(134,135), 185 (49), 215(167), 220(174), 221(174), 226(49), 238(174), 239(24,25), 241 (17,212-215), 242(212-215), 243 (223), 244(223), 250(254), 251(256), 252(260,262,264-266), 253 (212-215), 254(260,261), 258-268

Mazzei, A., 247(240), 248(240), 267

Medvedev, S. S., 74(43,60,61), 76(60, 106,107,119), 79(60,148,149,154, 160,173,174), 97(60,61,154), 103(60, 61), 105-108

Meier, J. F., 79(153), 85(238), 108, 110

Mendelson, R. A., 230(193), 265

Merckling, N. G., 169(120), 170(120), 262

Meyerhoff, G., 74(26,27), 85(26,87, 233), 104, 106, 110

Meyersen, K., 93(280), 94(280), 99 (280), 111

Michael, A., 74(82), 93(82), 106

Michel, R. H., 82(217), 109

Michelotti, F. W., 243(221), 266

Miles, M. L., 244(234), 245(234), 267

Milkovich, R., 71(1), 74(1,17), 85(17), 103, 104

Miller, F. F., 83(232), 110

Miller, M. L., 75(97), 76(123,124), 106, 107, 249(250,250a), 267

Miller, R. G., 81(209), 109

Miller, R. L., 34(5), 36(5,9), 60, 68, 69

Mills, B., 81(209), 109

Milovskaya, E. B., 206, 264

Minoux, J., 78(143,144), 79(151,155, 170), 107, 108

Minsker, K. S., 169(128a), 170(128a), 172(128a), 173(136a), 204(136a), 207, 249(247a), 263, 264, 267

Miotta, M., 125, 269

Mise, H., 75(99), 106

Mitsengendler, S. P., 80(195), 82 (341), 109, 113

Miyazawa, T., 13(13), 14, 18(19), 20 (19), 21(26), 22, 31, 59, 69, 177 (139), 263

Moacanin, J., 75(92), 92(274), 106, 111

Mognaschi, E. R., 38(18), 39(18), 42 (18), 68, 163(98), 220(98,173), 262, 264

Montagnoli, G., 209(98a), 213, 262

Montague, B. A., 243(220), 266

Montecatini, 37(12), 56(12), 63(12), 64(12), 68, 118(7), 122(7), 141(7), 247(7), 268

Moore, J. E., 81(208), 109

Moore, L. D., 93(283), 94(283), 112

Moraglio, G., 69, 117(3), 119(3), 258

Morero, D., 239(201), 247(240), 248 (240), 265

Morikawa, H., 236(194), 265

Morita, H., 79(168), 108

Moriyama, T., 88(258), 90(258), 91 (258), 111

Morrow, R. C., 88(257), 111

Morton, M., 71, 72(13), 74(17,54,56), 79(54,56,153,156-158), 85(17,156, 234), 89(268), 90(268), 94(277), 95 (277), 97(56,157,158), 103(56,157, 158,321), 104, 105, 108, 110, 111, 113

Mosevitskii, M. I., 86(249), 111

Motroni, G., 241(213), 242(213), 253 (213), 266

Motta, L., 69

Mukamal, H., 83(223), 110

Mulley, R. D., 169(108), 170(108), 262

Mulvaney, J. E., 72(5), 103

Murahashi, S., 190, 263

Myers, W., 8(10), 17, 31

Myers, W. L., 80(198), 109

N

Nagai, E., 51(31), 68

Nametkin, N. S., 250(254b), 267

Nanda, V. S., 86, 110

National Distillers and Chemical Corp., 100(306), 112

Natta, G., 33-35, 37, 38(16-18), 39, 40(16,17), 41, 42(17,18), 43, 46(17), 51-54, 56, 58-60, 61(16,17,41,72), 62(41,56), 63, 64, 65(17), 67-69, 75(105), 82(214), 83(228), 106, 109, 110, 117(2-5), 118(6,12,17-20), 119, 120, 121(4,5,24,25), 122(6,24-27), 123(30), 124(32-34), 125(30,36), 126, 127, 130(30), 135, 136(51), 137, (51), 139, 140(57), 141, 143, 144, 152, 156(30), 157, 158, 162(96), 167, 169(125), 170(125), 171, 173, 177 (4,5,137), 178, 179, 186(142), 187 (142), 188, 189(144), 193(4,5), 194 (148), 209(96), 215, 217(96), 218 (96), 220, 221(174), 224 (182,183), 225, 228(5), 230, 233, 235, 236, 238 (174), 239(24,25,197,201), 240(12), 241(17,212-215), 242, 243(223), 244(223), 247(27,240,242), 248 (240,242,245), 250(254), 251(27, 256), 252(262,265,266), 253, 268- 273

Naumann, A. W., 1, 13(16), 26(30), 28(30), 31

Negishi, S., 83(337), 113

Nelkin, M., 3(7), 24(7), 30

Nenitzescu, C. D., 148, 152, 156, 261

Nesmeyanov, A. N., 169(119), 170 (119), 262

Nevitt, T. D., 169-171(112), 262

Newburg, N. R., 121(22,23), 122(22, 23), 123(23), 139, 218, 239(22,23), 259

Newport, J. P., 103(322), 113

Nicolescu, I. V., 243(222), 244, 266

Nielsen, J. R., 26, 27(32), 31

Nielsen, L. E., 36(9), 68

Nikolaev, N. I., 79(171), 108, 208 (164a), 264

Nishioka, A., 51(32), 68

Noguchi, H., 243(228), 269

Nove, K., 88(258), 90(258), 91(258), 111

Nowakowska, M., 221(179a), 265

Nowlin, G., 122(28), 247(28), 259

Nozaki, K., 123(31), 269

Nozakura, S., 191(146), 263

Nukada, K., 52-55, 68, 69

O

Obaid, R. M. S., 142(62b), 260
 Obloj, J., 221, 265
 O'Driscoll, K. F., 74(51,65), 103(65), 105
 Ohnishi, S., 52-55, 68, 69
 Oita, K., 153, 169-171(112), 261, 262
 Oiwa, M., 243(230), 267
 Oliverio, P., 65(64), 69
 Olson, S. G., 252(263), 268
 Okada, K., 18(24), 31
 Okano, K., 27(34), 31
 Onsager, O. T., 79(163,164,167), 97 (164,167), 103(164,167), 108
 Orofino, T. A., 86, 94(278), 95(278), 110, 111
 Osipova, L. V., 239(203,204), 265
 Otsu, T., 241(209,209a), 266
 Ottolenghi, A., 75(95,98), 106
 Overberger, C. G., 72(5), 79(185), 83 (223,226), 103, 109, 110, 142(62a), 239(202), 260, 265
 Overhauser, A. W., 54, 69
 Owen, G. D. T., 207(159), 264
 Owens, F. H., 80(198), 81(206,208), 109
 Ozaki, S., 83(223), 110
 Ozeki, T., 51(31), 68

P

Paddubny, I. Ya., 86(249), 111
 Pajaro, G., 224(182), 252(260,262, 264), 254(260,261), 265, 268
 Panchak, 89-91(261), 111
 Parkinson, D. B., 250(253), 267
 Parravano, G., 83(229), 110
 Parrod, J., 79(159), 81(205), 87(205, 276), 89(267), 95(276), 97(159), 98 (205,276), 99(276), 101(267), 103 (159), 108, 109, 111
 Pasquon, I., 37, 38(16-18), 39, 40(16, 17), 41, 42(17,18), 43, 46(17), 56, 58(17), 60(11,16), 61(16,17), 63(11, 16,17), 64, 65(17), 65, 117(4,5), 118 (17,19), 121(4,5), 123(30), 125(30, 36), 126(30), 127(30), 130(30), 139

(4,5), 156(30), 158(36), 163(98), 177 (4,5), 179(44f), 193(4,5), 194 (148), 220(98,173), 224(183,184), 228(5), 230(30), 235(30), 236(30), 241(17), 255-260, 262-265
 Patat, F., 79(146), 97(146), 103(146), 107, 143, 144, 152, 167, 261
 Paul, D. E., 74(37), 104
 Pearce, W. M., 79(185), 109
 Pegaso, M., 37(11), 56(11), 58, 60 (11), 61(41), 62(41), 63(11), 64(11), 68, 69, 194(148), 263
 Pepper, D. C., 72(2), 103
 Peraldo, M., 37(11), 56, 58-60, 62 (43,56), 63(11,56), 64(11), 68, 69
 Perry, E., 156(83), 227(83), 230(83), 233(83), 236(83), 261
 Peška, J., 77(127,330), 107, 113
 Pett, R. A., 103(321), 113
 Philips Petroleum Co., 100(302,308, 309), 101(302,309), 112
 Phillips, G. W., 139(53), 220(53), 254 (53), 255(53), 260
 Pines, D., 1(1), 3(1), 30
 Pino, P., 52(35), 60(35), 68, 117(3), 119(3), 121(24,25), 122(24,25), 139 (24,25), 157(24,25,87), 162, 169-172 (122), 209, 210, 211(97), 212-217, 218(96), 239(24,25), 258, 259, 261, 262, 264
 Pirogov, O. N., 48(24), 68, 264
 Plate, N. A., 82(344), 113
 Platz, R., 169(121), 170(121), 262
 Podolsky, A. F., 74(39), 102(39), 104
 Pokatilo, N. A., 241(210a), 266
 Polyakov, D. K., 74(61), 79(149,154, 174), 97(61,154), 103(61), 105, 107, 108
 Porri, L., 122(26), 124(32), 126(32), 127(32), 141(60,61), 169(125), 170 (125), 171, 179, 186(142), 187(142), 241(212), 242(212), 247(240), 248 (240,245), 253(212), 259, 260, 263, 266, 267
 Porter, L. M., 118(9), 122, 141(9), 247 (9), 255
 Porter, R. S., 51(33), 68

Powell, T., 251, 267

Pozamantir, A. G., 160, 161, 175(91), 224, 261

Prask, H., 17(18), 21(18), 22, 31

Pregaglia, G., 173(134), 263

Ptitsyn, O. B., 65(63), 69

Pucci, S., 52(35), 60(35), 68

Pummer, W., 77(329), 113

Pyrakov, L. M., 88(255), 111

R

Radcliffe, A. T., 83(227), 110

Radlmann, E., 66, 69

Radok, J. R. M., 86, 110

Raff, R. A. V., 238(195), 265

Rakova, G. V., 79(176), 108, 245 (234a), 267

Rakus, J. P., 138(51c), 260

Rauhut, C. E., 76(123), 107

Razuvaev, G. A., 169(128a), 170 (128a), 172(128a), 207, 249, 263, 264, 267

Reding, F. P., 253(259), 268

Reid, J. A., 198(149), 263

Reikhsfeld, V. O., 243(227), 266

Reilly, C. A., 49(36), 50(36), 52, 53, 68

Rembaum, A., 74(18), 75(92), 80 (189), 83(218,219), 85(18,234), 88 (257), 89(189,268), 90(268), 92 (274), 104, 106, 109-111

Rempp, P., 75(102), 81(205), 87(205, 276), 88(256), 89(256,264,265, 267), 90(256), 91(256), 92(273), 94 (102,282), 95(276), 98(205,256, 276,292,293), 99(276), 101(267), 106, 109, 111, 112

Resnick, W., 146, 147(72), 261

Reynolds, W. B., 96(305), 100(305), 101(305), 112

Ricchezza, E. N., 74(65), 103(65), 105

Richards, D. H., 89(266), 98(266,291), 99(294), 111, 112

Ridgewell, B. J., 169(124a), 170(124a), 172(124a), 263

Robertson, R. E., 76(117), 107

Robinson, G. C., 77(338), 113

Robinson, I. M., 243(220), 266

Rodriguez, L. A. M., 125, 126(44, 44a-e), 129, 151, 164, 173(44d), 179 (44e), 182, 183, 188(44e), 259, 260

Rogers, C. E., 79(152,169,180), 108

Roggero, A., 136(49), 185(49), 226 (49), 260

Roha, M., 219, 264

Roig, A., 81(204), 85(204), 109

Roland, J. R., 78(132), 107

Romanov, L. M., 245(234a), 267

Roovers, J. E. L., 74(79), 106

Rose, 228

Rubin, I. D., 139(53a), 191, 260

S

Sachs, R. G., 2(5), 3(5), 30

Sadron, C., 81(205), 87(205), 98(205), 109

Saegusa, T., 75(99), 106, 243 (218, 218a), 249(238), 266, 267

Safford, G. J., 1, 2(3), 7(3), 13(16), 17(3), 18, 19(3,21), 21, 23(25), 24(3), 25(3), 26(30), 27(3), 28(30), 30, 31

Saito, N., 27, 31

Sakellarios, E., 82(213), 109

Salter, D. A., 99(294), 112

Saltman, W. M., 179, 186, 263

Sanderson, J. J., 74(78), 106

Sangalov, Yu. A., 249(247a), 267

Sartori, G., 118(15,16), 243(219,236), 245(235), 246(236), 252(15,16,260, 265,266), 254(260,261), 258, 259, 266-268

Sasaki, K., 190(145), 263

Satoh, S., 51(31), 68

Sauer, J. A., 18(22), 31

Schacht Schneider, J. H., 18(20,23), 31, 59, 61, 62, 69

Schafer, O., 76(111), 106

Schildknecht, C. E., 251(257), 268

Schiller, A. H., 83(226), 110

Schiller, A. M., 72(5), 103

Schindler, A., 95(290), 112, 156(84), 162, 163, 169, 219, 220(178), 224, 261, 264, 265

Schisseler, D. O., 140(58), 171, 260

Schlenk, W., 74(82), 76(108,115), 93 (82), 106

Schlick, S., 88(254), 111

Schmidt, H., 144, 145, 261

Schmidt, R. F., 83(232), 110

Schneider, N. S., 78(138), 107

Schnurmans, J. L., 230(193), 265

Schoenberg, E., 99(299), 112

Schreiber, H., 81(207), 109

Schulz, G. V., 74(32-34,36,38), 97(32, 33,36,38,318), 102, 104, 112

Schulz, R. C., 82(334), 83(225), 110, 113

Schutze, H. G., 169(111), 170(111), 262

Schwartz, R. B., 4(8), 31

Scott, K. W., 85(236), 110

Scott, N. D., 74(40), 78(128,129), 104, 107

Segre, A. L., 38(18), 39(18), 42(18), 51-54(34), 68, 220(173), 264

Semenova, L. S., 207(162b), 264

Seydel, G., 230(191), 235(191), 236 (191), 238(191), 265

Shashoun, V. E., 82(211,212), 96 (212), 109

Shcherbakova, I. M., 243(229), 266

Shearer, N. H., Jr., 169(132), 170 (132), 172(132), 263

Shibayov, L. A., 88(255), 111

Shilov, A. E., 166, 219(102), 262

Shilov, A. Y., 166, 219(102a), 262

Shilova, A. K., 166, 219(102a), 262

Shimanouchi, T., 13(13,14), 14, 18 (14), 31

Shimidzu, T., 230(188), 233(188), 265

Shimizu, A., 241(209,209a), 266

Shinomiya, M., 21(29), 22, 31

Shoji, A., 82(336), 113

Sianesi, D., 215(168), 239(200,201), 249(248,249), 264, 265, 267

Sidorova, L. G., 152, 261

Sigwalt, P., 89(260,262), 91(262), 111

Simon, F. T., 13(16), 31

Singwi, K. S., 1-3(2), 6(2), 30

Sinn, H., 74(70), 79(146,161-167), 97 (146,164,166,167), 103(146,164, 167,315), 105, 107, 108, 112, 143, 144, 152, 167, 261

Sinn, V., 78(143), 79(159,170), 97 (159), 103(159), 107, 108

Sirianni, A. F., 75(84), 85(84), 106

Skogman, J., 76(124), 107

Slonim, I. Ya., 48, 68

Small, P. A., 81(209), 109, 169(108), 170(108), 262

Smets, G., 89(263), 111

Smid, J., 72(8), 74(23-25,29,44,45), 75 (90,91), 83(230), 97(23-25,45,316, 317), 102(23,25,45,316,317), 104- 106, 110, 112

Smith, D. R., 122(28), 247(28), 259

Smith, J. J., 169-171(123), 221(123, 180), 263, 265

Smith, R. K., 207(159a), 264

Smolyan, Z. S., 219, 264

Snyder, R. G., 18(20,23), 31, 59, 61, 62, 69

Snyder, W. H., 81(208), 109

Soddy, T. S., 96(314), 112

Soematsu, I., 243(217), 266

Solomon, O. F., 250(252), 267

Solovykh, D. A., 76(119), 107

Sovich, R. C., 82(335), 113

Spach, G., 74(80), 106

Speigelman, P. P., 83(229), 110

Spell, A., 81(210), 109

Spirin, Yu. L., 74(60,61), 76(60), 79 (60,148,149,154,174), 97(60,61,154), 103(60,61), 105, 107, 108

Spurlin, H. M., 118(13), 190, 228(13), 234(13), 252(13,263), 255(13), 258, 263

Stake, M. A., 212(165), 264

Stauffer Chemical Co., 125(35), 126 (35), 135(35), 259

Stavely, F. W., 78(142), 107

Stearne, J., 74(44), 88(347), 105, 113

Stearns, R. S., 166, 219(102b), 262

Stedefeder, J., 220(177), 265

Stehling, F. C., 48, 51(28), 52(28), 68

Stewart, F. D., 83(232), 113

Stiles, E., 78(136), 80(192,193), 85
(193), 107, 109

Stille, J. K., 118(11), 244(11), 258

Stokes, A., 207(159a), 264

Stopa, G., 141(61), 260

Story, V. M., 75(93), 106

Stotskaya, L. L., 152, 261

Strange, E., 78(140), 107

Strauss, S., 75(89), 78(130), 85(89),
106, 107

Stretch, C., 74(46,47), 85(47), 105

Strobel, C. W., 100(301,303), 101
(301,303), 112

Stroupe, J. D., 81(210), 109

Subramanian, R. V., 260

Sumi, M., 191(146), 263

Suminoe, T., 190, 263

Summerfield, G. C., 2(4), 3(4), 5(4),
7, 8, 17, 30, 31

Suttle, A. D., Jr., 169(111), 170(111),
262

Swalen, J. D., 53(38), 68

Sweeny, W., 82(212), 96(212), 109

Swift, H. E., 167, 262

Szutty, J. S., 80(333), 113

Szwarc, M., 71(1), 72(3,4,7-9,12),
74(1,23-25,29,42,44,45,80,81),
75(90,91), 80(189), 83(230), 85(18),
86, 89(189), 93(81), 97(23-25,45,
316,317), 98(266,291), 102, 103-
106, 109-112

T

Tabata, Y., 79(187), 109

Takahashi, A., 141(55), 247(55), 260

Takami, Y., 169(118), 170(118), 262

Takase, T., 18(24), 31

Talamini, G., 69

Tamura, V., 83(337), 113

Tan, Y. Y., 220(175), 265

Tanaka, S., 236, 265

Tapp, W. J., 82(215), 109

Tasumi, M., 13(13,14), 14, 18(14), 31

Teiffert, W., 213

Temussi, P. A., 60(72), 61(72), 69

Tennent, H. G., 197, 234(147), 263

Thal, A., 74(82), 93(82), 106

Thomas, P. R., 75(94), 83(227), 106,
110

Tiers, G. V. D., 35, 48

Tieszen, D. O., 250(253), 267

Tietz, R. T., 82(212), 96(212), 109

Tincher, W. C., 51(29,30), 52, 53, 55,
68

Tobin, M. C., 21(28), 22, 31

Tobolsky, A. V., 74(51), 79(168,169,
178-180), 80(190), 88(257), 106,
108, 109, 111

Toelle, K. J., 97(317), 102(317), 112

Tolchinskii, I. M., 250(254b), 267

Tomescu, M., 250(252), 267

Topchiev, A. V., 152, 156, 239(203,
204), 240, 241(210a), 250(254b),
251(257a), 261, 265-268

Towsend, J., 74(37), 104

Trementozzi, Q. A., 48(23), 51(23),
54, 55, 58(23), 64, 68

Trevino, S. F., 17(18), 21(18), 22, 31

Troutman, J., 118

Truchmanova, L. B., 79(147,175),
97(147), 107, 108

Truett, W. L., 243(220), 266

Trumbull, H. L., 83(232), 110

Tsao, I., 169(119), 170(119), 262

Tsujino, T., 243(218,218a), 266

Tsukamoto, A., 75(101), 106

Tsurata, T., 83(220), 110

Tsuruta, T., 79(188), 80(199), 81
(188), 109, 146, 261

Tsuzun-Chan, L., 126(45b), 131, 260

Tucker, H., 79(145), 107

Turba, V., 243(236), 245(235), 246
(236), 267

Turner-Jones, A., 81(209), 109, 179,
261

Turov, B. S., 207(160), 264

Tyler, G. J., 75(94), 83(227), 106, 110

U

Uelzmann, H., 145, 261

Uematsu, I., 64(58), 69

Uhniat, M., 221(179a), 265

Ullman, R., 80(333), 113

Uno, K., 79(339), 113

Uranek, C. A., 99(298), 112

Urwin, J. R., 88(347), 113

Uryu, T., 79(187), 109

V

Valvassori, A., 58(44), 69, 118(15-17), 241(17), 243(236), 245(235), 246(236), 252(15,16,260,262,264-266), 254, 258, 259, 267, 268

Vandenberge, E. J., 156(86), 224(86), 225, 251, 261, 268

Vandenbergh, J., 239(199), 265

Van Ess, P. R., 96(314), 112

Van Hove, L., 4, 5(9), 31

Vaughan, G., 207(159), 264

Vecchi, E., 130, 260

Verkhoturova, A. P., 245(234a), 267

Vesely, K., 206, 264

Vikoloev, H. I., 79(182), 108

Vilim, R., 206(155), 264

Vinogradov, P. A., 207(160), 264

Vofsi, D., 89(269), 111

Vogel, G., 103(323), 113

Volkov, V. I., 81(205), 87(205), 98(205), 109

Vranken, A., 75(91), 106

Vries, H. de, 173(136b), 263

W

Waack, R., 74(18,67), 85(18), 104, 105

Wales, M., 86, 246

Walker, J. F., 78(129), 107

Wall, L. A., 48, 55, 68, 75(89), 77(329), 78(130), 85(89), 99(295), 106, 107, 112, 113

Wallach, J., 77(328), 113

Wallach, M. L., 88(346), 113

Walter, E. R., 253(259), 268

Wanless, G. G., 240(205), 266

Wannier, G. H., 13, 31

Ward, I. M., 59, 69

Watanabe, W. H., 81(210), 109

Watson, A. T., 169(111), 170(111), 262

Watson, W. H., Jr., 243(226), 266

Weber, H., 224, 265

Weiner, M., 103(323), 113

Weiss, G., 86, 110

Weissman, S., 74(37), 104

Weitz, H. M., 169(121), 170(121), 262

Welch, F. J., 74(50), 97(50), 105

Wenger, F., 74(16,30,31,41), 75(87), 88, 80(191), 85(16,41,87,88), 86, 93(286), 95(278), 104, 106, 109-112

Wenz, A., 76(114), 106

Werber, F. X., 169-171(109,110,124), 253, 262, 263

West, R., 103(323), 113

Wiberg, K. B., 241(211), 242(211), 266

Wichterle, O., 77(127,330), 107, 113

Wieland, H., 82(213), 109

Wiles, D. M., 74(28), 80(196,197), 200,201), 81(202), 104, 109

Wilke, G., 248(244), 267

Williams, J. L. R., 74(74), 105

Wiman, R. E., 139(53a), 191, 260

Wittig, G., 103(325), 113

Wofford, C. F., 94(281), 111

Wollthan, H., 76(110,112,114), 106

Wood, P. G. M., 81(209), 109

Woodbrey, J. C., 48(21,23), 51(21,23), 54, 55, 58(23), 64, 68

Wooding, N. S., 74(75-77), 105, 106

Woodward, A. E., 18(22), 31

Wooten, W. C., Jr., 169-171(116), 262

Worsfold, D. J., 74(20,35,52,53,55,57, 81), 75(84-86), 76(122), 79(172,

177), 85(20,84), 93(81,288), 97(35,

52,122,172,177), 102(35), 103(52,

122,172), 104-108, 112

Wright, A. N., 74(28), 104

Wszolek, W. R., 169(109,110,114,124), 170(109,110,114,124), 171(109,110, 124), 253(109), 262, 263

Wyman, D. P., 74(66,342), 85(66), 93(280), 94(280), 96(313), 99(280), 105, 111-113

Y

Yagi, T., 230(188), 233(188), 265

Yamamoto, T., 18(24), 31

Yamazaki, N., 190(145), 265

Yarovitskii, P. A., 167, 262
 Yen, S. P. S., 74(48), 85(48), 93(286),
 94(48), 95(48), 105, 112
 Yerasova, Ye. L., 241, 266
 Yokomichi, S., 243(230), 267
 Yoncoskie, B., 80(192), 109
 Yoshioka, S., 88(258), 90(258), 91
 (258), 111
 Young, H. S., 78(132), 107
 Youngman, E. A., 33, 37-40(14), 41,
 42(14), 43(14), 44, 45(14), 46(14),
 55(14), 58(14,42), 61(14), 63(14,42),
 64(14,42), 65(14), 68, 69, 136(50,
 59), 138(50), 140(59), 169(115), 170
 (115), 174(115,136), 175(136), 179
 (59), 185(59), 187(115), 193, 195
 (59), 225(115), 230, 241(216), 242
 (216), 253(59), 260, 262, 263, 266
 Yu, H., 76(125), 78(137), 107
 Yuasa, S., 230(188), 233(188), 265
 Yuguchi, S., 241(210), 266

Z

Zambelli, A., 37, 38(16-18), 39, 40

(16,17), 41, 42(17,18), 43, 46(17),
 51-54(34), 56, 58(14), 59, 60(11,
 16), 61(16,17), 63(11,16,17), 64, 65
 (17), 68, 117(4,5), 118(17,19), 121
 (4,5), 125(36), 139(4,5), 158(36),
 163, 177(4,5), 179(44f), 193(4,5),
 194(148), 205, 206, 220, 228(5),
 241(17), 258-260, 262-264
 Zanini, G., 122(26), 259
 Zannetti, R., 130(46), 260
 Zefirova, A. K., 166, 262
 Zelinski, R. P., 94(281), 100(301,303),
 101(301,303,310), 111, 112, 122(28),
 247(28), 259
 Zgonnik, V. N., 208, 264
 Zharov, A. A., 48, 68
 Ziegler, K., 33, 37(12), 56(12), 63(12),
 64(12), 67, 68, 76(109-114,116,
 118), 78(135), 87(109), 106, 107,
 117(1), 119, 120, 215, 258
 Zilkha, A., 74(49,69), 75(95,96,98,
 100), 105, 106
 Zimmerman, H., 161(92), 261
 Zoss, A. O., 251(257), 268

Subject Index

A

Acenaphthalene, anionic polymerization of, 75
Ziegler polymerization of, 243
Acetylenes, Ziegler polymerization of, 243-244
Acrylamide, anionic polymerization of, 75
9-Acrylcarbazole, anionic polymerization of, 75
Acrylonitrile, anionic polymerization of, 75
block copolymers of, 89-91
Allene, Ziegler polymerization of, 244
Allyl acrylate, anionic polymerization of, 76
Allyl methacrylate, anionic polymerization of, 76
Allyl silanes, Ziegler polymerization of, 250
 $\text{Al}(\text{iBu})_3 + \text{TiCl}_4$, polymerization of α -olefins, 209-210
 $\text{Al}(\text{iBu})_3\text{-TiCl}_4$, valence of, 221
 $\text{Al}(\text{iBu})_3\text{-VOCl}_3$, polymerization of conjugated trienes, 249
 $\text{Al}(\text{iBu})_3\text{OEt} + \text{TiCl}_4$, polymerization of ethylene, 141
 $\text{AlCl}_3 + \text{CoCl}_3$, proposed structure of, 140
 $\text{AlEtCl}_2\text{-TiCl}_3$, activation by inorganic halides, 205
addition of electron donors to, 206-208
asymmetric bimetallic complex model of, 178
copolymerization of ethylene and propylene, 175
polymerization of propylene, 117

rate of polymerization of ethylene with, 231, 234
rate of polymerization of propylene with, 231, 234
 $\text{AlEt}_2\text{Cl} + \text{CoCl}_3$, polymerization of butadiene, 122
polymerization of dienes, 121
 $\text{AlEt}_2\text{Cl-CoCl}_2$ -tributylphosphate, polymerization of butadiene, 122
 $\text{AlEt}_2\text{Cl} + \text{Cr}(\text{acetylacetone})_3$, polymerization of butadiene, 119
 $\text{AlEt}_2\text{Cl} + \text{NiCl}_3$, polymerization of dienes, 121
 $\text{AlEt}_2\text{Cl-Ti}(\text{C}_2\text{H}_5)_2\text{Cl}_3$, copolymerization of ethylene and 1-butene, 191
effect of oxygen on, 218
polymerization of ethylene, 191
 $\text{AlEt}_2\text{Cl-TiCl}_4$, polymerization of ethylene, 161
 $\text{AlEt}_2\text{Cl} + \text{VCl}_4$, proposed structure of, 140
valence of vanadium in, 220
 $\text{AlEt}_2\text{Cl-VOCl}_3$, copolymerization of ethylene and propylene, 221
 $\text{AlEt}_2\text{Cl} + \text{VO(OEt)Cl}_3$, copolymerization of ethylene and propylene, 122
 $\text{AlEt}_3 + \text{NbCl}_5$, 123
 AlEt_3 , polymerization of ethylene, 119
 $\text{Al}(\text{Et})_2\text{X-TiCl}_4$, effect of different halogen on stereospecificity of, 158-159
 $\text{AlEt}_3\text{-ScCl}_3$, valence of Sc in, 220
 $\text{AlEt}_3 + \text{Ti}(\text{O-iBu})_4$, 141
addition of electron donors to, 206-208
addition of triethylamine to, 199-200

copolymerization of ethylene and propylene, 122

polymerization of propylene, 123, 127, 129, 130, 194, 224

rate of polymerization of propylene with, 231, 235

$\text{AlEt}_3\text{-TiCl}_4$, copolymerization of styrene and alkenyltrimethyl silanes, 190-191

instability of, 227-228

polymerization of butadiene, 119, 122

polymerization of ethylene, 148, 161

polymerization of isoprene, 122

valency of titanium in, 219

$\text{AlEt}_3\text{-VO(OEt)}_3$, instability of, 228

$\text{AlR}_3\text{Cl} + \text{TiCl}_4$, bimetallic mechanism for, 143-147

$\text{AlR}_2\text{X-VCl}_4$ Ziegler catalysts, polymerization of propylene, 38-43, 117, 139, 194

$\text{AlR}_3 + \text{Cr(acetylacetone)}_3$, polymerization of styrene, 142

$\text{AlR}_3 + \text{TiCl}_2$ (cyclopentadiene), polymerization of styrene, 142

Anionic polymerization, effect of solvent on, 102-103

kinetics of, 97, 102

mechanism of, 96, 97, 102, 103

monodisperse polymers from, 84-86

monomers, 73-84

preparation of block and graft copolymers by, 86-92

of unsaturated monomers, 71-103

Anisole, addition to a Ziegler catalyst, 37-39

Asymmetric polymerization, 162, 209-218

Aufbau reaction 119, 156

B

Biallyl, copolymer with ethylene, 245

Bimetallic mechanism, 142-147

Bier proposal for, 144-145

Boor proposal for, 146, 147

de Bruin proposal for, 142-143

Eirich and Mark proposal for, 143

experimental evidence for, 157-176

Friedlander and Resnick proposal for, 146-147

Gumboldt and Schmidt proposal for, 144-145

Huggins proposal for, 146

Natta proposal for, 143-144

Patat and Sinn proposal for, 143-144

in stereoselective polymerization, 215-216

Uelzmann proposal for, 145

Block copolymers, by anionic polymerization, 86-91

by Ziegler polymerization, 255-256

Bound anionic mechanism, 154-155

Branched polymers, synthesis of, 92-94

p-Bromostyrene, block copolymers of, 90-91

Butadiene, anionic polymerization of, 76

block copolymers of, 88, 90

branched polymers from, 95

polymerization, by allyl nickel bromide, 171

and resulting structural unit, 247

Ziegler, 118, 119, 122, 139

1-Butene, copolymer with ethylene, 42, 44, 139, 191, 194, 252, 253

copolymers, reactivity ratios for, 252

polymerization of, addition of activators, 201-202, 205

2-Butene, copolymer with ethylene, 118, 253

isomerization and polymerization of, 240-241

tert-Butyl acrylate, anionic polymerization of, 76

block copolymer with ethylene, 249-250

Ziegler polymerization of, 121, 249

tert-Butyl crotonate, anionic polymerization of, 76

n-Butyl isocyanate, anionic polymerization of, 76

block copolymers of, 88, 90, 91

Butyllithium-TiCl₄, 120, 249
 Butyl methacrylate, block copolymer of, 90
tert-Butyl methacrylate, anionic polymerization of, 76
tert-Butyl perbenzoate, addition to a Ziegler system, 40

C

Carbodiimides, dialkyl, anionic polymerization of, 77
 Chloroprene, anionic polymerization of, 76-77
p-Chlorostyrene, Ziegler polymerization of, 251
 Chromatographic resolution of racemic poly(α -olefins), 209-210
 CoCl₂, solubilization by complexation or chelation, 141
 CoCl₂:AlCl₃, polymerization of butadiene, 171
 Copolymerization, 252-256
 formation of block copolymers, 255, 256
 monomer structure, and, 253, 254
 reactivity ratios, 252
 Crotonaldehyde, anionic polymerization of, 77
 Cyanoacetylene, anionic polymerization of, 77
 Cyanogen, anionic polymerization of, 77
 Cyclic olefins, copolymers with ethylene, 242, 253
 Ziegler polymerization of, 241-243
 Cyclobutene, Ziegler polymerization of, 118, 241-242
 1,3-Cyclohexadiene, Ziegler polymerization of, 246, 249
 Cyclohexene, copolymerization with ethylene, 118, 253
 Cyclopentene, Ziegler polymerization of, 240, 241

D

Debye-Waller factor, 5-7

Diallyl silanes, copolymers with propylene, 250
 Ziegler polymerization of, 250
 Dicyanoacetylene, anionic polymerization of, 77
 Dienes, conjugated, Ziegler polymerization of, 246-249
 nonconjugated, Ziegler polymerization of, 244-246
 1,2-Dihydronaphthalene, anionic polymerization of, 78
 block copolymers of, 89
 Dihydropyran, Ziegler polymerization of, 251
 1,2-Diisocyanates, anionic polymerization of, 75
 Diisopropenylbenzene, Ziegler polymerization of, 240
 3,7-Dimethyl-1-octene, asymmetric polymerization of, 211, 213, 214
 polymerization of, 209-214
 Diphenylvinylphosphine oxide, anionic polymerization of, 78
trans-Divinylcyclobutane, Ziegler polymerization of, 246

E

Electron donors, effect on syndiotacticity of polypropylene, 39, 46, 47
 rate lowering or enhancement of Ziegler polymerization, 199-208
 site removal by, 187-188, 191-193
 Electron microscopy, 129, 131, 134, 165
 Electron spin resonance, determination of valence in Ziegler catalysts, 220
 Ethylene, anionic polymerization of, 78
 block copolymer with *tert*-butyl acrylate, 249-250
 block copolymer with propylene, 42, 43, 256
 copolymer, with biallyl, 245
 with 1-butene, 42, 44, 139, 191, 194, 252, 253
 with 2-butene, 118, 253

with cyclohexene, 118, 253
 with propylene, 42, 43, 122, 139,
 166, 170-171, 175, 199, 221,
 252-255
 with propylene, fractionation of,
 189-190
 copolymerization with inactive
 monomers, 253
 copolymers, with cyclic olefins, 242,
 253
 reactivity ratios for, 252
 kinetics of Ziegler polymerization of,
 230-233, 234, 235
 polymerization of, 33, 117, 119, 121,
 122, 130, 139, 140, 141, 148-149,
 152-153, 157, 160-163, 165-167,
 198-199, 219-221, 224, 239
 effect of electron donors on, 205
 effect of oxygen on, 218-219
 by metal alkyl-free catalysts, 169-
 172
 Ethylene oxide, block copolymers of,
 89-90

F

Formaldehyde, block copolymers of,
 88, 90, 91
 Furans, Ziegler polymerization of, 251

G

Graft copolymers, by anionic poly-
 merization, 87, 92

H

ω -Halo-olefins, polymerization and
 copolymerization by Ziegler
 catalysts, 251
 Heterotacticity index, 36
 1,5-Heptadiene, Ziegler polymerization
 of, 245
 1,5-Hexadiene, polymerization of, 118
 Hexatriene, anionic polymerization of,
 78
 Hexyl methacrylate, block copolymers
 of, 89, 90

I

Infrared spectroscopy, studies of poly-
 propylene, 56-60
 Isobutylene, Ziegler polymerization of,
 240
 Isocyanates, alkyl anionic polymeriza-
 tion of, 78, 82
 Isoprene, anionic polymerization of,
 78-79
 block copolymers of, 88-89
 polymerization of, and resulting
 structural unit, 248
 Ziegler polymerization of, 121, 122,
 179, 186
 Isopropyl acrylate, block copolymers
 of, 89-90

L

Living polymers, 71-73, 95
 formation of branches, 92, 93, 94
 formation of functional end-groups,
 92, 95, 98-101
 molecular weight distribution of, 86
 reaction, with carbon dioxide, 95-96
 with cyanogen, 96, 101
 with phosgene, 95, 98
 with toluene-2,4-diisocyanate, 96,
 101
 use for chain extension, 92, 93, 95, 96

M

Maleimides, *N*-substituted, anionic
 polymerization of, 79
 Methacrylonitrile, anionic polymeriza-
 tion of, 79
 block copolymers of, 89
 Metal alkyl-free catalyst, comparison
 to conventional Ziegler catalyst,
 174-176
 evidence for growth at transition
 metal-carbon bond, 169-174
 polymerization, of dienes, 171
 of α -olefins, 169-174
 rate of, 169

stereoregularity of polymers prepared with, 160, 173

Methyl acrylate, anionic polymerization of, 79

1-Methylenecyclohexene-2, Ziegler polymerization of, 249

2-Methylene-5-norbornene, Ziegler polymerization of, 245, 246

4-Methyl-1-hexene, Ziegler polymerization of, 209, 214, 217

Methyl methacrylate, anionic polymerization of, 80-81

block copolymers of, 88-91

3-Methyl-1-pentene, asymmetric polymerization of, 211, 213, 214

Ziegler polymerization of, 209-211, 213, 214

4-Methyl-1-pentene, polymerization of, addition of activators, 201-202

α -Methyl styrene, anionic polymerization of, 75

block copolymers of, 88, 91

deuterated anionic polymerization of, 77

α -Methyl benzyl methacrylate, anionic polymerization of, 80

N-Methyl- α -methyl benzyl acrylamide, anionic polymerization of, 82

2-Methyl-5-vinyl pyridine, block copolymers of, 91

α, ω -Methylene diisocyanates, anionic polymerization of, 79

Monodisperse polymers, preparation of, 84-86

Monoisocyanates, anionic polymerization of, 82

Monometallic mechanism, 148-152

Carrick proposal for, 148-149

Cossee proposal for, 149-151, 181

Duck proposal for, 153-154

evidence for, from copolymerization studies, 168-169

Friedlander and Oita proposal for, 153

Ludlum proposal for, 148

Nenitescu proposal for, 148

Rodriguez-van Looy proposal for, 151-152

in stereoselective polymerization, 215-216

Van Helden and Kooyman proposal for, 153-154

Morphology of polyolefins, crystallized from the melt and from solution, 137-138

prepared by a heterogeneous Ziegler catalyst, 137-138

prepared by a soluble Ziegler catalyst, 137-138

N

Neutron inelastic scattering, basic features, 1, 2

determination of lattice vibrations, 3

effect of, degree of branching, 27

degree of crosslinking, 27

glass-transition temperature, 23, 24, 27, 28

sample density, 27-29

temperature, 5, 23, 24, 27

elastic-coherent scattering, 2

elastic-incoherent scattering, 3

experimental results, 13-29

inelastic-coherent scattering, 3

instrumentation, 9-12

see also time-of-flight spectrometer, Triple-axis spectrometer

neutron-nucleus interaction, 1

normal-mode analyses, 13

nuclear magnetic resonance correlation, 27

nylon-6, 21-23

one-phonon approximation, 5, 16

n-paraffins, 18, 19, 21

polarization vectors, calculation, 7

polyethylene, 8, 13-19, 24, 25

polypropylene, isotactic, 18-20, 25

polytetrafluoroethylene, 26-29

scattering cross section, 3-5

scattering law, 3, 4

scattering, types of, 2, 3

spectra of hydrogenous polymers, 4, 5

theory of, 2-9

use of, 2

2-Nitrobutene, anionic polymerization of, 82

Nitroethylene, anionic polymerization of, 82

Nitropropene, anionic polymerization of, 82

Norborene, Ziegler polymerization of, 243

Nuclear magnetic resonance, aluminum-27 spectra, 167
calculated spectra for polypropylene, 52-54
chemical shifts for polypropylene, 52
correlation with neutron scattering studies, 27
coupling constants for polypropylene, 52
existence of Ti-C bond from, 167
spectra of, isotactic polypropylene, 50
syndiotactic polypropylene, 49
study of deuterated polypropylene, 48-49, 51-53

Nylon-6, neutron scattering studies on, 21-23

O

Octamethylcyclotetrasiloxane, block copolymers of, 89, 90

α -Olefins, Ziegler polymerization of, 239-240

Optically active Ziegler catalysts, 209-211, 214

Oxygen, activation of Ziegler catalysts by, 39, 218-219
contamination of AlEt₃ by, 229

P

1,3 Pentadiene, stereoregular polymerization of, 180-181, 186-187

Perfluoropropylene, Ziegler polymerization of, 249

2-Phenyl butadiene, anionic polymerization of, 82

Phenyl isocyanate, anionic polymerization of, 82

Phenyl methacrylate, anionic polymerization of, 82

Phillips catalyst, 197, 199

Poisson distribution, 72, 84

Polar monomers, Ziegler polymerization of, 249-252

Polybutadiene, chain model of syndiotactic, 137
formation of functional end-groups, 99-101
microstructure of, 190-191
monodisperse, 85
structural repeating units, 118
syndiotactic, 121-122
cis-1,4-Polybutadiene, 120, 122, 140, 141, 171, 181
trans-1,4-Polybutadiene, synthesis of, 171, 181
Poly-1-butene, 136, 138
stereoregularity of, as a function of the metal alkyl, 160

Polyethylene, calculation of polarization vectors for, 7
commercial, 120
molecular weight of, as a function of metal alkyl, 161
molecular weight distribution of, 238
morphology of, 137
neutron scattering studies on, 8, 13-19, 24-25
phase-frequency relationships, 13-17, 24, 25

Polyethylene oxide, formation of functional end-groups, 101

Polyisoprene, formation of functional end-groups, 101
monodisperse, 85
cis-1,4-Polyisoprene, 120, 122

Poly-4-methyl-1-hexene, chromatographic resolution of, 210, 214

Poly(methyl methacrylate), monodisperse, 85

Poly-(*S*)-3-methyl-1-pentene, column support, in chromatographic resolution, 209-210

Poly-4-methyl-1-pentene, 120

Poly- α -methylstyrene, monodisperse, 85

Poly- α -olefins, synthesis of isotactic, 121

cis-1,4-Polypentadiene, chain model of, 137
isotactic, 141

Polypropylene, atactic, 36
autoxidation of, as a function of tacticity, 66
fractionation of, 189
infrared studies of tacticity of, 56-60
isotactic, 120, 136
calculated and observed neutron scattering bands, 18-20
chain model of, 135
chemical shifts and coupling constants, 52
melting point of, 64, 134
model for propagation, 182-183
observed and calculated NMR spectra of, 50-56
schematic representation of, 34
molecular weight distribution of, 238
nuclear magnetic resonance studies on deuterated, 49, 51-53
stereoregularity of, as a function of the metal alkyl, 158-160
syndiotactic, 33-67
chain conformation of, 60-62
chain model of, 136
characterization and properties of, 48-66
chemical shifts and coupling constants, 52
conformation in solution, 55, 65
crystal density, 60-61
crystallinity of, 61, 62, 64
enthalpy of fusion of, 64
glass transition temperature of, 65
helical form, 61
infrared spectra of, 57
mean square dipole moment of, 65
mean square end-to-end distance of, 65
mechanical properties of, 65

melting point of, 63, 64, 136
model for propagation, 44, 45, 46, 185, 194-195
observed and calculated NMR spectra of, 49, 51-56
planar zigzag form, 62
polymerization conditions, 40-42
polymerization mechanisms, 43-48, 194-195
schematic representation of, 35
solubility of, 65
synthesis by free-radical polymerization, 48
synthesis by Ziegler-type catalysts, 37-43, 121, 177, 193-195
unit cell dimensions, 60
x-ray studies of, 61, 63

syndiotactic index, effect of aging of catalyst on, 41
effect of, cyclohexene on, 39
tert-butyl perbenzoate on, 40
catalyst preparation temperature on, 40
electron donors on, 39, 46, 47
oxygen on, 39
polymerization time on, 40, 41
solvent impurities on, 40
polymerization temperature and, 40, 41, 194
tacticity from NMR, 48-56

Polystyrene, formation of functional end-groups, 98, 99
monodisperse, 85
rate of crystallization of, 138

Polytetrafluoroethylene, neutron scattering studies on, 26-29
observed and calculated vibrational frequencies in, 26

Propylene, block copolymer with ethylene, 42, 43, 255, 256
copolymer with ethylene, 42, 43, 122, 139, 166, 170-171, 175, 199, 221
fractionation of, 189-190

copolymers, reactivity ratios for, 252

copolymers with diallyl silanes, 250

kinetics of Ziegler polymerization of, 230-233, 234, 235

polymerization of, 37-48, 117, 125, 127, 129, 130, 139-141, 177, 197-199, 220-221, 224, 225, 229 as a function of the metal alkyl, 163 effect of electron donors on, 191-192, 201-203, 205 molecular weight during, 237 in presence of triethylamine, 201-203

polymerization by metal alkyl-free catalysts, 169, 171, 172, 174

N-Propyl-*N*- α -methyl benzyl acylamide, anionic polymerization of, 82

R

Radical mechanism, 152-154 incompatibility with experimental findings, 156

Nenitzescu proposal for, 152

Topchiev proposal for, 152-153

S

Scandium, valence of, in Ziegler catalysts, 220

$\text{Sn}(\text{C}_2\text{H}_5)_4\text{-VCl}_4\text{-AlBr}_3$, 122, 139, 140, 221 copolymerization of ethylene and propylene, 254 structure of, 140

Sorbic acid esters, anionic polymerization of, 75

Star polymers, 93, 94

Stereoselective polymerization, mechanism of, 212, 215-218

Styrene, anionic polymerization of, 74 block copolymers of, 88-89 branched polymers from, 94 copolymers with alkenyltrimethyl silanes, 190-191 polymerization by soluble Ziegler catalysts, 142

Syndiotactic index, 38-40, 41, 55, 57

T

Tacticity, definitions, 34-36

degree of, 35-36

nomenclature, 34, 35

Tetrahydrofuran, block copolymer of, 89

Thiophene, Ziegler polymerization of, 251

Time-of-flight spectrometer, basic principles, 9-11

nylon-6 distributions, 23

Polyethylene distributions, 15, 17, 25

Polypropylene distribution, 19

Polytetrafluoroethylene, 28, 29

Schematic representation of, 10

Utility of, 12

Valence of, in Ziegler catalysts, 218-223

Titanium trichloride, α -form, 124-131, 158-159, 184

β -form, 124-127, 131, 158-159, 184

Changes in the physical state of, 126-134

Composition and structure of, 123-128

Crystalline modifications of, 124-128, 181, 188

δ -form, 124-126, 131, 134

Effect of mechanical grinding on activity of, 130-133

Effect of previous physical treatments on polymerization rate, 130

γ -form, 124-126, 130-133, 158-159, 184

Location of active sites in, 125, 128, 129

Reaction with aluminum alkyls, 164-169

$\text{TiCl}_3 + \text{Et}_2\text{N}$, copolymerization of ethylene and propylene, 175

Polymerization of propylene, 175

Tributylamine, addition to Ziegler systems, 201, 204, 205

Triethylamine, addition to Ziegler systems, 37, 188, 192, 199-203, 205

Triethylvinylgermanium, anionic polymerization of, 82

Triethylvinyltin, anionic polymerization of, 82

Triple-axis spectrometer, basic principles, 9, 11-12
schematic representation of, 11
utility of, 12

Triple-crystal spectrometer, *see* triple-axis spectrometer

V

Vanadium, valence of in Ziegler catalyst, 220-223

Vanadium tetrachloride, 37, 38, 40

Vanadium triacetylacetone, 37, 38

Vanadium trichloride, reduction to VCl_3 , 220-221

Van Hove spatial correlation function, 4

Vinyl acetate, anionic polymerization of, 82
copolymer with vinyl chloride, 249

9-Vinylanthracene, anionic polymerization of, 82, 83

p-Vinyl benzamide, anionic polymerization of, 83

Vinyl carbazole, Ziegler polymerization of, 250

Vinyl chloride, anionic polymerization of, 83
copolymer with vinyl acetate, 249
Ziegler polymerization of, 121, 249

Vinyl ethers, anionic polymerization of, 83
cationic polymerization of, 251
copolymerization of, using Ziegler catalysts, 251

Vinylidene chloride, anionic polymerization of, 83

Vinylidene cyanide, anionic polymerization of, 83

Vinyl isocyanate, anionic polymerization of, 83

Vinyl ketones, anionic polymerization of, 83

Vinyl monochloroacetate, anionic polymerization of, 82

α -Vinyl naphthalene, block copolymers of, 88

Vinyl pyridine, anionic polymerization of, 83
block copolymers of, 89, 91

X

X-ray analysis, of syndiotactic polypropylene, 61, 63

Z

Ziegler catalyst, activation of, by oxygen, 39, 218-219
activity of, compared to metal alkyl-free catalysts, 175
addition of electron donors to, 39, 46, 47, 187-188, 191-193, 199-208
aging of, 40, 41
asymmetry of bimetallic sites, 178
catalyst preparation temperature and stereospecificity, 40-41, 139
cleavage of catalyst crystals, 136
colloidal dispersion, 141
crystal structure and molecular structure of polymers, 184
crystal surface, importance of, 176
definition of, 120-121
discovery of, 119
effect on, of the physical state of the polymer, 122-123
formation of polymer particles, 135-138
heterogeneous type, 123-139, 254, 255
instability of, 227-228
mechanism of formation of an active site, 142-155
nature of the growth center, 155-176
number of active sites, 174-175
optically active, 209-211, 214
origin of metal-carbon bond in, 172-174
physical state of the catalyst, 121-142
reaction of TiCl_3 and aluminum alkyls, 164-169
sites of differing activity, 188-193
soluble catalyst, 37-43, 122, 139-142, 157-158, 254, 255, 137-138

stability of metal-carbon bond, 222-223

transition metals having more than 3d electrons, 197-198

valence state of individual active sites, 221-223

valence state of transition metal, 218-223

see also Bimetallic mechanism, Metal alkyl free catalyst, Monometallic mechanism

Ziegler polymerization, activation energy of, 238

activity of, as a function of the metal alkyl, 163

asymmetric polymerization, 162, 209-218

base metal-carbon bond as the growth center, 156-164, 176

chain transfer by metal alkyl, 236

concentration dependence of kinetics, 228, 230-233

concentration of sites in, 231, 235

dependence of molecular weight on metal alkyl structure, 161

deuterium transfer during, 162-163

effect of bulkiness of added amines on, 192, 201

electron donors and rate of, 199-208

fractionation of copolymers from 189-191

fractionation of polymers from, 189

helical model of propagation, 178-179, 183, 185

impurities effecting kinetics, 229

kinetics of, 226-238

lifetime of sites and growing polymer chains, 236-237

ligand-monomer interaction model, 180, 181, 187-193, 195-196

metal alkyl and copolymerization, 168

metal-carbon bond as growth center, 156, 163

mixing of catalyst components for, 229

model for syndiotactic propagation of polypropylene, 44-46

molecular weight distributions from, 237, 238

monomer-metal alkyl interaction model 182-183

monomer-monomer interaction model, 183, 185, 193-195

cis opening of double bond, 177

orientation of diolefins 179-181, 186-187

origin of stereoregulation, 176-199

polymerization temperature, 233

radical mechanism for polar monomers, 249, 251

rate constants of, 231, 236

rate-determining step of, 234

rates of, 230-231, 234-235

stereospecificity of, as a function of the metal alkyl, 158-160, 177

steric control of propagation, 178-183, 185

structure of transition compound and copolymerization, 168

termination of, 223-226

by hydrogen, 224-225

by metal alkyls, 224-225

by organic chlorides, 160-162, 175-176, 223, 224

by thermal cleavage, 226

by unsaturated compounds, 225-226

transition metal-carbon bond as the growth center, 164-176, 195-199

transport of monomer to the site, 229, 233

unified model for, 195-199

see also Copolymerization, Radical mechanism, Stereoselective polymerization

$ZnEt_2-ScCl_3$, inactivity of, in propylene polymerization, 163, 164

$ZnEt_2-TiCl_4$, addition of electron donors to, 200-203

polymerization of propylene, 161, 187-188

Zn -bis-[(*S*)-2-methyl-butyl]- $TiCl_4$, asymmetric polymerization with, 162, 209-212, 214, 215

